IMPROVING SITE SAFETY COMMUNICATION AND CLIMATE THROUGH A SAFETY AND COMMUNICATION PROGRAM

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Evidence indicates that incentive programs that reward based on lagging indicators of safety (e.g. injury rates) can lead to a decrease in injury reporting, not actual injury. Novel, yet largely untested, approaches to safety incentive programs instead rely on pre-incident measures of safety such (e.g. hazard recognition). B-SAFE, a safety communication and recognition program that uses safety inspection data to provide feedback to construction workers, is a leading indicator-based safety incentive program that may offer such an alternative, yet the effectiveness is unknown.

A cluster randomized controlled trial on the effectiveness of the B-SAFE safety communication and recognition program was conducted on eight worksites of varying sizes and stages for approximately five months per site in the Boston area. Each intervention site was matched to a control project under the same general contractor or owner. At both intervention and control sites surveys were collected from workers (n=1289, baseline response rate =74%) before they started on the jobsite, as well as monthly throughout their time on-site (response rate for on-site and thus eligible for follow up =88%). The surveys included a 9-item safety climate scale. Additionally, focus groups (n=6-8 workers/site) were conducted at the end of data collection at all sites to qualitatively assess the program's impact on workers' perception of site safety.

Transcripts from focus groups were coded and analyzed for thematic content using Atlas.ti(V7). Survey data was analyzed through a pre-post exposure analysis using data from the baseline survey as the pre-exposure measurement and the data from a workers last survey as post-exposure data. Multi-level mixed effect regression models evaluated the effect of the intervention on safety climate.

At all B-SAFE intervention sites, workers noted increased levels of safety awareness, communication, and teamwork, when compared control sites. Workers at intervention sites attributed an increase in morale to B-SAFE, noting that increasing safety performance feedback helped to improve safety conditions. One worker stated, "[B-SAFE] increased the level of awareness around safety conditions on-site (…) Instead of cutting corners, we'd do it right."

The mean safety climate score at intervention sites increased 1.3 points between pre- and post-B-SAFE exposure, compared to control sites that decreased 0.2 points (scale ranged: 0-90). The intervention effect size was 2.29 (p-value=0.012), when adjusted for month the worker started on-site, total length of time on-site, as well as individual characteristics (trade, title, age, and race/ethnicity).

B-SAFE led to many positive changes on-site, including an increase in safety climate, awareness, teambuilding, and communication. However, these results also highlight the challenges that exist in measuring intervention effectiveness on construction sites through psychometrics, as they represent complex measures of perceptions. Furthermore, due to the dynamic nature of the construction work environment, a large proportion of workers who completed baseline surveys (nearly half) had left the site before the one-month follow up period and were therefore not captured in the evaluation, which could represent a form of length-biased sampling and thus bias the results towards the null. Finally, it should be acknowledged that the B-SAFE program is a tool to be added to a site with an already strong system of safety, which all of the study sites had. This could help explain the strong qualitative results but the relatively low numeric changes seen in the quantitative data. The mixed method approach used helps us understand where the intervention might have had an effect.

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